LINKSYS®

A Division of Cisco Systems, Inc.

Power
Ethernet
Link / Act

LINKSYS®   PowerLine Ethernet Bridge
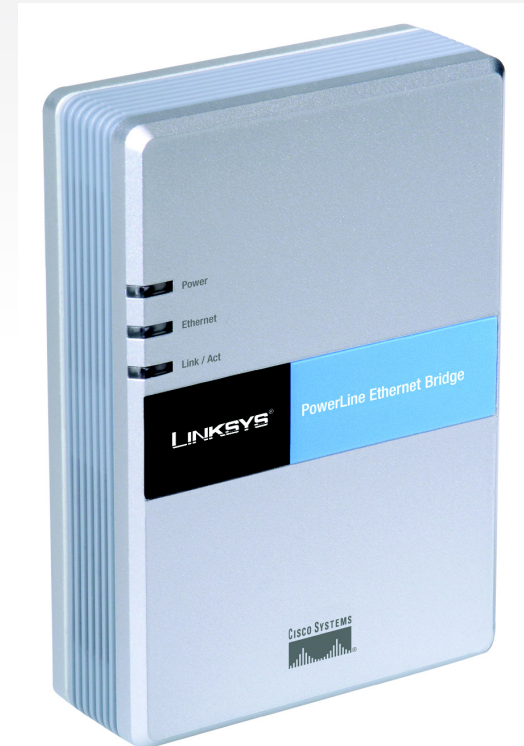
CISCO SYSTEMS®

Powerline Ethernet Bridge

User Guide

WIRED

Model No. **PLEBR10**

CISCO SYSTEMS®

Copyright and Trademarks

Specifications are subject to change without notice. Linksys is a registered trademark or trademark of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries. Copyright © 2004 Cisco Systems, Inc. All rights reserved. Other brands and product names are trademarks or registered trademarks of their respective holders.

> **WARNING:**   This product contains chemicals, including lead, known to the State of California to cause cancer, and birth defects or other reproductive harm. *Wash hands after handling.*

How to Use this User Guide

The user guide to the PowerLine Ethernet Bridge has been designed to make understanding networking with the PowerLine Ethernet Bridge easier than ever. Look for the following items when reading this User Guide:

This checkmark means there is a note of interest and is something you should pay special attention to while using the PowerLine Ethernet Bridge .

This exclamation point means there is a caution or warning and is something that could damage your property or the PowerLine Ethernet Bridge .

This question mark provides you with a reminder about something you might need to do while using the PowerLine Ethernet Bridge .

In addition to these symbols, there are definitions for technical terms that are presented like this:

> *word:* definition.

Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this:

Figure 0-1: Sample Figure Description

Figure numbers and descriptions can also be found in the "List of Figures" section.

Table of Contents

List of Figures

Chapter 1: Introduction

Welcome

Thank you for choosing the PowerLine Ethernet Bridge. The Bridge will allow you to network better than ever.

How does the Bridge do all of this? The PowerLine Ethernet Bridge lets you turn the existing powerlines in your home or office into a high-speed network. Now you don't have to drill through the walls, and climb through the attic or cellar to install network cables, just use the wires that already run through the building.

But what does all of this mean?

Networks are useful tools for sharing computer resources. You can access one printer from different computers and access data located on another computer's hard drive. Networks are even used for playing multiplayer video games. So, networks are not only useful in homes and offices, they can also be fun.

The PowerLine Bridge interfaces Ethernet devices to the HomePlug PowerLine network standard. Just plug the PowerLine Bridge into the wall, and connect your Ethernet-equipped device to the Bridge using the included network cable, and you've turned your whole house into a network infrastructure. Attach more computers to the network by simply plugging them into the wall anywhere in the house, using more PowerLine Bridges, or the Linksys PowerLine USB Adapter.

Once your computers are connected to the network, they can share resources like printers and storage space, and all kinds of files: music, digital pictures, and documents. With up to 14Mbps data rates, you can play head-to-head network computer games, too. And if you use a PowerLine Bridge to interface one of the famous Linksys Broadband Routers from your cable or DSL Internet connection to your PowerLine network, you'll be able to get to the Internet from any computer in the house.

Use the instructions in this Guide to help you connect the Bridge, set it up, and configure it to bridge your different networks. These instructions should be all you need to get the most out of the Bridge.

Welcome

1

What's in this Guide?

This user guide covers the steps for setting up and using the PowerLine Ethernet Bridge.

- Chapter 1: Introduction
  This chapter describes the Bridge's applications and this User Guide.

- Chapter 2: Planning Your PowerLine Network
  This chapter discusses a few of the basics about PowerLine networking.

- Chapter 3: Getting to Know the PowerLine Bridge
  This chapter describes the physical features of the Bridge.

- Chapter 5: Connecting the PowerLine Ethernet Bridge
  This chapter shows you how to connect the bridge to your PC.

- Chapter 6: Using the PowerLine Configuration Utility
  This chapter show you how to use the Configuration Utility

- Appendix A: Troubleshooting
  This appendix describes some potential problems and solutions, as well as frequently asked questions, regarding installation and use of the Adapter.

- Appendix C: Windows Help
  This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.

- Appendix D: Glossary
  This appendix gives a brief glossary of terms frequently used in networking.

- Appendix E: Specifications
  This appendix provides the PowerLine Ethernet Bridge's technical specifications.

- Appendix F: Warranty Information
  This appendix supplies the PowerLine Ethernet Bridge's warranty information.

- Appendix G: Regulatory Information
  This appendix supplies the PowerLine Ethernet Bridge's regulatory information.

- Appendix H: Contact Information
  This appendix provides contact information for a variety of Linksys resources, including Technical Support.

Chapter 2: Planning your PowerLine Network

Network Topology

With the PowerLine products, a network can be created using home powerlines. Computers can be networked over powerlines using PowerLine devices. The Bridge connects an Ethernet-enabled computer to a powerline network. The PowerLine USB Adapter is also available for connecting a USB-enabled computer to a powerline network.

The Bridge is also ideal for any user who already has a router and wants to share high-speed Internet access across the powerline network. Connect the Bridge to the router after you have configured the Bridge using the PowerLine Configuration Utility. Connect a straight-through Category 5 Ethernet network cable to the uplink port of the router, or connect a crossover Category 5 Ethernet network cable to a LAN port on the router.

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at www.linksys.com for more information about powerline products.
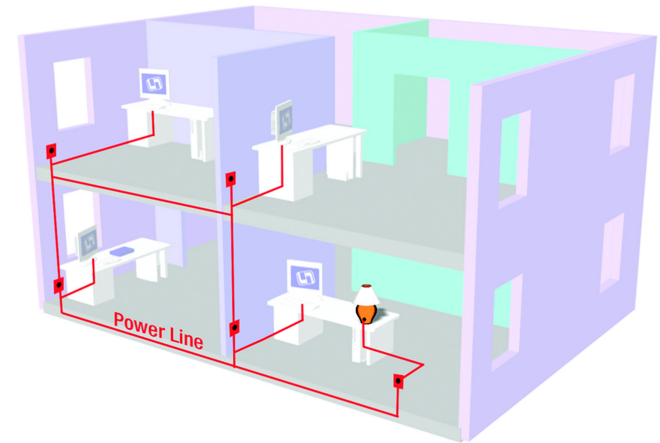
Figure 2-1: PowerLine Network

Chapter 3: Getting to Know the PowerLine Bridge

The Top Panel

The Bridge's Port, where the Ethernet Port is connected, is located on the front panel.

Ethernet   The Ethernet Port is where you will connect the included Category 5 Ethernet network cable.
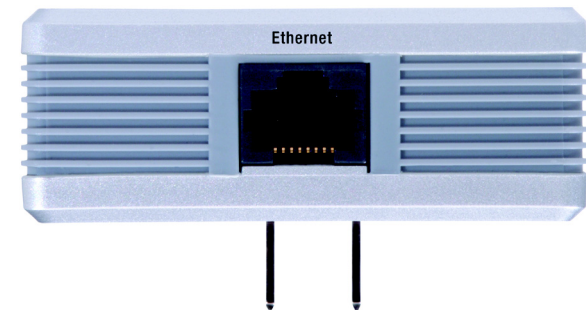
Figure 3-1: Top Panel

The Front Panel

The Bridge's LEDs, where information about network activity is displayed, are located on the front panel.

Power   Green. The Activity LED will flash when there is data transmitted over the powerline network.

Ethernet   Green. The Ethernet LED will be lit steadily when there is an active Ethernet connection.

Link/Act   Green. The Link LED will light up when the PowerLine Bridge is powered on.
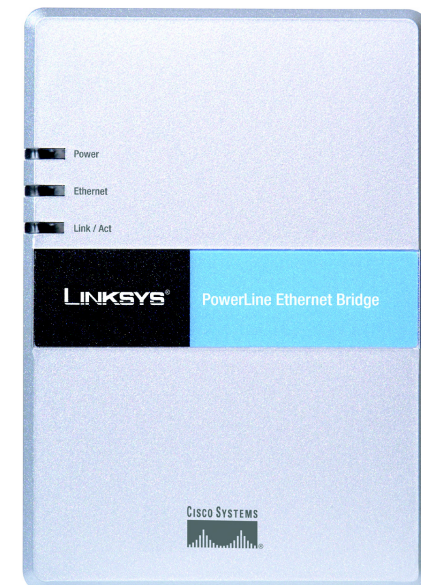
Figure 3-2: Front Panel

Chapter 4: Connecting the PowerLine Ethernet Bridge

Connecting the Bridge

> ⚠️ **IMPORTANT:** Do NOT use a switch to connect multiple powerline devices to your PC's Ethernet port. Each powerline device should be connected to its own Ethernet port on the PC.

1. Plug the included Category 5 Ethernet network cable into the computer's Ethernet port.

Figure 4-1: Ethernet Port on PC

2. Plug the other end of the cable into the Ethernet port of the Bridge.
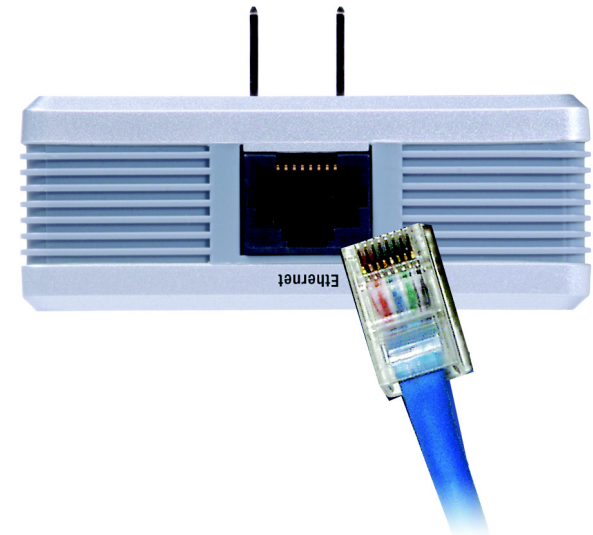
Figure 4-2: Ethernet Port on Bridge

3. Plug the Bridge into an electrical outlet.

![warning icon] **IMPORTANT:** Because the Bridge sends data over the power lines of your house, plug the Bridge directly into an electrical outlet. Do not plug the device into a UPS or power strip with surge protection. The Bridge has its own power filter for protection against surges.

The installation of the Bridge is complete.

If you want to configure the Bridge, proceed to "Chapter 6: Using the PowerLine Configuration Utility."
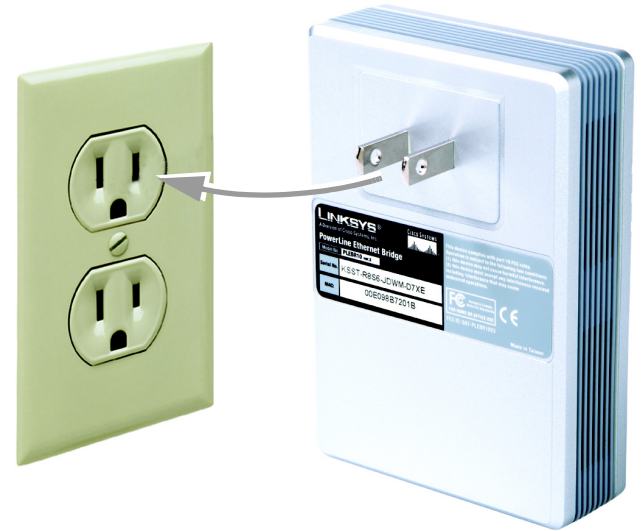
Figure 4-3: Plug in the Bridge

Connecting to a Router

If you want to connect the Bridge to a router, then proceed to the next section, "Connecting to a Router."

If you want to share high-speed Internet access across a powerline network, then you can choose to connect the Bridge to a router.

Follow these instructions:

Disconnect the network cable from the PC, and connect it to the uplink port of the router. If you only have a LAN port available on the router, then use a crossover Category 5 Ethernet network cable to connect the Bridge to the router. The installation of the Bridge is complete.

Chapter 5: Using the PowerLine Configuration Utility

Overview

After installing the Bridge, you will run the Setup Wizard to install the PowerLine Configuration Utility. Use this utility to check the PC's direct connection to the powerline network, search for powerline devices on your network, and set up security using a network password.

Setup Wizard

1. After the installation of the Bridge is complete, the *Main Menu* screen will appear. Click Setup to run the Setup Wizard.

    You can also click User Guide to view this User Guide, click LINKSYS Web to link to the Linksys website, www.linksys.com, or Exit to exit this utility.

2. When the *Stop* screen appears, click the **Next** button. You already have connected the Bridge.

Note: If you want the devices on your powerline network to share high-speed Internet access, connect the Bridge to a router after you run the PowerLine Configuration Utility. Refer to "Chapter 5: Connecting the PowerLine Ethernet Bridge."

Figure 5-1: Main Menu

Figure 5-2: Stop

3. The *Installing Configuration Utility* screen will appear while the files are being installed.
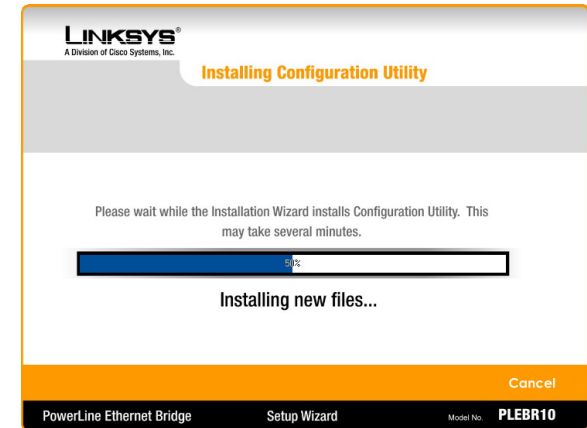
Figure 5-3: Installing Configuration Utility

4. The *Congratulations* screen will appear when the installation is complete. Click **Online Registration** to register the product or click **Exit** to exit the Wizard.
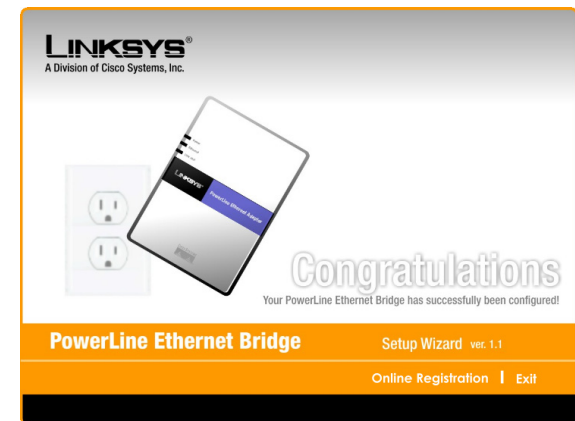
Figure 5-4: Congratulations

5. The next screen will appear when you exit the Wizard. You will need to restart your computer to use the Utility. Click **Yes** to restart your computer now, or click **No** to restart your computer later.
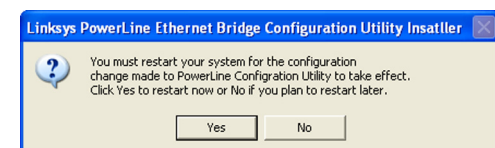
Figure 5-5: Utility Insattler

Accessing the PowerLine Configuration Utility

1. To access the PowerLine Configuration Utility, double-click the PowerLine Configuration Utility icon on your desktop.

Figure 5-6: PowerLine Configuration Utility Icon

2. The Welcome screen will appear. Click the **Next** button.

3. The Device screen will appear. You have a choice of four screens:

• Device - Select which local powerline device to use when connecting your PC to the powerline network.

• Network - Discover what powerline devices are on the powerline network.

• Security - Set the password for your current local device.

• About - If you have an active Internet connection, connect to Linksys's website, www.linksys.com, from this screen.

Figure 5-7: Welcome

MAC Address: The unique Media Access Control address that a manufacturer assigns to each networking device.

The Device screen lists the powerline devices connected to your PC.

Status - This indicates which powerline device is currently used by the PC.

Device - The name of each powerline device is displayed here.

MAC address - The MAC address of each powerline device is shown here.

Link Quality - The signal quality of the powerline network connection is indicated here.

Connect - Select the Device you want to use to access the powerline network, and then click the **Connec**t button.

Figure 5-8: Device Tab

Network

The Network screen allows you to search the powerline network for all powerline devices configured with the same Network Password as the device you are currently using for your PC.

MAC address - The MAC address of each powerline device is shown here.

Data Rate (Mbps) - The transmission speed of the powerline device is displayed here.

Scan Network - Click the **Scan Network** button to perform a search for all powerline devices configured with the same Network Password.
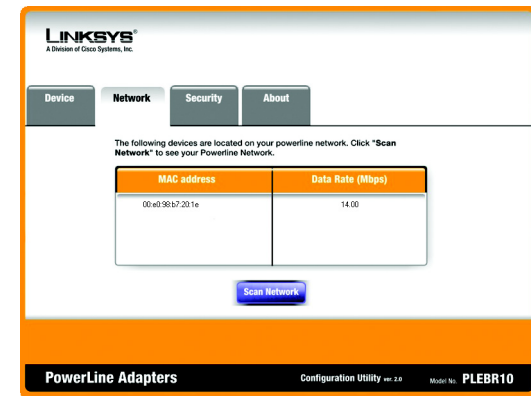
Figure 5-9: Network Tab
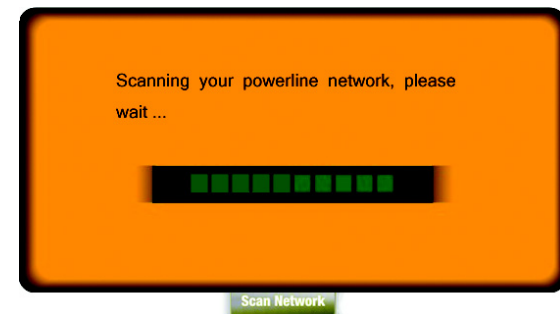
Figure 5-10: Scanning Your Network

Security

The Security screen allows you to set the Network Password of the powerline device being used by your PC. All of the powerline devices on your powerline network must use the same Network Password.

Network Password - This must have between 4 and 24 characters. The Network Password is case-sensitive, so note whether you use lowercase or uppercase letters. It can include any letters of the alphabet, numbers, or punctuation marks.

Set - Enter the Network Password in the Network Password field. Then click the Set button.

Restore Default - Click the Restore Default button to set the Network Password back to its factory default setting, HomePlug. Then click the Set button.

Note: Remember this password. You will need to set this password on each powerline device on your powerline network.

Figure 5-11: Security Tab

About

The About screen offers a convenient link to the Linksys website, www.linksys.com. You must have an active Internet connection to use this link.
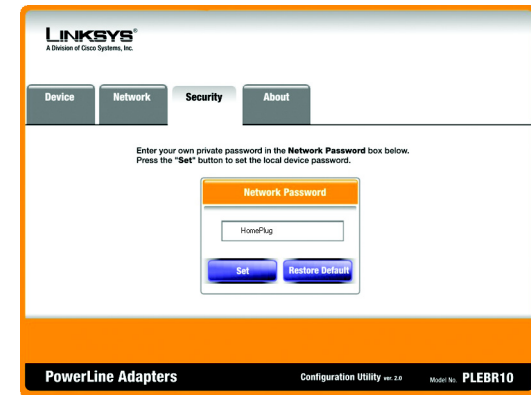
Figure 5-12: About Tab

Appendix A: Troubleshooting

This appendix consists of two parts: "Common Problems and Solutions" and "Frequently Asked Questions." This appendix provides solutions to problems that may occur during the installation and operation of this product. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at *www.linksys.com*.

Common Problems and Solutions

1. **None of the LEDs light up after I installed the Bridge.**
   - Unplug the Category 5 Ethernet network cable from the computer. Unplug the Bridge from the electrical outlet. Then repeat the hardware installation process. Make sure the electrical outlet is working properly.
2. **The Ethernet LED does not light up on the Bridge.**
   - When the Ethernet port detects a LAN connection, the Ethernet LED will light up. Check the Ethernet adapter on your computer to see if the connection and adapter are working properly. Make sure you are using the included Category 5 Ethernet network cable (which is straight-through) to connect the Bridge to your computer. Do not use a crossover cable.
   - For use with a router, connect a straight-through, Category 5 Ethernet network cable to the uplink port of the router, or connect a crossover, Category 5 Ethernet network cable to a LAN port on the router.
3. **When I scan the powerline network, I don't detect all the powerline devices.**
   - Make sure all devices on the powerline network have been configured with the same Network Password. The Network Password must be identical in order for them to communicate with each other. See "Chapter 6: Using the PowerLine Configuration Utility."
4. **I can't connect to other computers on my powerline network or to the Internet.**
   - Make sure the IP address and TCP/IP protocol are set up correctly for all the powerline networked computers. For more information on IP addresses and TCP/IP, refer to your Windows help or documentation.
   - Make sure all devices on the powerline network have been configured with the same Network Password. The Network Password must be identical in order for them to communicate with each other. See "Chapter 6: Using the PowerLine Configuration Utility."

Frequently Asked Questions

What types of picture files can I show with the Adapter?
The Adapter supports picture files with the following file extensions: BMP, GIF, JPG, and TIF. All of these file types are converted to JPG format when they appear on your TV, so some data loss may occur. This may affect image quality, so the image quality you see on your TV might not be as good as the image quality you see on your PC.

Do the Instant PowerLine products cause interference with other home networking or powerline products?

No. The Instant PowerLine products can co-exist with phoneline and wireless networking technologies. Instant PowerLine operates in a different frequency band than powerline control and can co-exist with technologies such as X-10, CEBus, and LONworks.

How do the Instant PowerLine products handle signal interference between two adjacent homes? How is eavesdropping prevented?

To ensure network separation between homes, the Instant PowerLine products use 56-bit DES security encryption, which is enabled by default. To encrypt data, this encryption method uses the Network Password you set using the PowerLine Configuration Utility.

How do the Instant PowerLine products handle node addressing on the network?

The Instant PowerLine products adhere to standard Ethernet addressing protocols using destination and source MAC addressing.

Appendix B: Windows Help

All wireless products require Microsoft Windows. Windows is the most used operating system in the world and comes with many features that help make networking easier. These features can be accessed through Windows Help and are described in this appendix.

TCP/IP

Before a computer can communicate within a network, TCP/IP must be enabled. TCP/IP is a set of instructions, or protocol, all PCs follow to communicate over a network. This is true for wireless networks as well. Your PCs will not be able to utilize wireless networking without having TCP/IP enabled. Windows Help provides complete instructions on enabling TCP/IP.

Shared Resources

If you wish to share printers, folder, or files over your network, Windows Help provides complete instructions on utilizing shared resources.

Network Neighborhood/My Network Places

Other PCs on your network will appear under Network Neighborhood or My Network Places (depending upon the version of Windows you're running). Windows Help provides complete instructions on adding PCs to your network.

Appendix C: Glossary

802.11a - A wireless networking standard that specifies a maximum data transfer rate of 54Mbps and an operating frequency of 5GHz.

802.11b - A wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

802.11g - A wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.

Access Point - A device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

Adapter - A device that adds network functionality to your PC.

Ad-hoc - A group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

AES (**A**dvanced **E**ncryption **S**tandard) - A security method that uses symmetric 128-bit block data encryption.

Backbone - The part of a network that connects most of the systems and networks together, and handles the most data.

Bandwidth - The transmission capacity of a given device or network.

Beacon Interval - Data transmitted on your wireless network that keeps the network synchronized.

Bit - A binary digit.

Boot - To start a device and cause it to start executing instructions.

Bridge - A device that connects different networks.

Broadband - An always-on, fast Internet connection.

Browser - An application program that provides a way to look at and interact with all the information on the World Wide Web.

Buffer - A shared or assigned memory area that is used to support and coordinate different computing and networking activities so one isn't held up by the other.

Byte - A unit of data that is usually eight bits long

Cable Modem - A device that connects a computer to the cable television network, which in turn connects to the Internet.

CSMA/CA (**C**arrier **S**ense **M**ultiple **A**ccess/**C**ollision **A**voidance) - A method of data transfer that is used to prevent data collisions.

CTS (**C**lear **T**o **S**end) - A signal sent by a wireless device, signifying that it is ready to receive data.

Daisy Chain - A method used to connect devices in a series, one after the other.

Database - A collection of data that is organized so that its contents can easily be accessed, managed, and updated.

DDNS (**D**ynamic **D**omain **N**ame **S**ystem) - Allows the hosting of a website, FTP server, or e-mail server with a fixed domain name (e.g., www.xyz.com) and a dynamic IP address.

Default Gateway - A device that forwards Internet traffic from your local area network.

DHCP (**D**ynamic **H**ost **C**onfiguration **P**rotocol) - A networking protocol that allows administrators to assign temporary IP addresses to network computers by "leasing" an IP address to a user for a limited amount of time, instead of assigning permanent IP addresses.

DMZ (**Dem**ilitarized **Z**one) - Removes the Router's firewall protection from one PC, allowing it to be "seen" from the Internet.

DNS (**D**omain **N**ame **S**erver) - The IP address of your ISP's server, which translates the names of websites into IP addresses.

Domain - A specific name for a network of computers.

Download - To receive a file transmitted over a network.

DSL (**D**igital **S**ubscriber **L**ine) - An always-on broadband connection over traditional phone lines.

DSSS (**D**irect-**S**equence **S**pread-**S**pectrum) - Frequency transmission with a redundant bit pattern resulting in a lower probability of information being lost in transit.

DTIM (**D**elivery **T**raffic **I**ndication **M**essage) - A message included in data packets that can increase wireless efficiency.

Dynamic IP Address - A temporary IP address assigned by a DHCP server.

EAP (**E**xtensible **A**uthentication **P**rotocol) - A general authentication protocol used to control network access. Many specific authentication methods work within this framework.

EAP-PEAP (**E**xtensible **A**uthentication **P**rotocol-**P**rotected **E**xtensible **A**uthentication **P**rotocol) - A mutual authentication method that uses a combination of digital certificates and another system, such as passwords.

EAP-TLS (**E**xtensible **A**uthentication **P**rotocol-**T**ransport **L**ayer **S**ecurity) - A mutual authentication method that uses digital certificates.

Encryption - Encoding data transmitted in a network.

Ethernet - A networking protocol that specifies how data is placed on and retrieved from a common transmission medium.

Finger - A program that tells you the name associated with an e-mail address.

Firewall - A set of related programs located at a network gateway server that protects the resources of a network from users from other networks.

Firmware - The programming code that runs a networking device.

Fragmentation -Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

FTP (**F**ile **T**ransfer **P**rotocol) - A protocol used to transfer files over a TCP/IP network.

Full Duplex - The ability of a networking device to receive and transmit data simultaneously.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Half Duplex - Data transmission that can occur in two directions over a single line, but only one direction at a time.

Hardware - The physical aspect of computers, telecommunications, and other information technology devices.

HomePlug - A home network that is based on Ethernet and uses existing power lines and AC outlets.

HTTP (**H**yper**T**ext **T**ransport **P**rotocol) - The communications protocol used to connect to servers on the World Wide Web.

Infrastructure - A wireless network that is bridged to a wired network via an access point.

IP (**I**nternet **P**rotocol) - A protocol used to send data over a network.

IP Address - The address used to identify a computer or device on a network.

IPCONFIG - A Windows 2000 and XP utility that displays the IP address for a particular networking device.

IPSec (**I**nternet **P**rotocol **Sec**urity) - A VPN protocol used to implement secure exchange of packets at the IP layer.

ISM band - Radio bandwidth utilized in wireless transmissions.

ISP (**I**nternet **S**ervice **P**rovider) - A company that provides access to the Internet.

LAN - The computers and networking products that make up your local network.

LEAP (**L**ightweight **E**xtensible **A**uthentication **P**rotocol) - A mutual authentication method that uses a username and password system.

MAC (**M**edia **A**ccess **C**ontrol) **Address** - The unique address that a manufacturer assigns to each networking device.

Mbps (**M**ega**B**its **P**er **S**econd) - One million bits per second; a unit of measurement for data transmission.

mIRC - An Internet Relay Chat program that runs under Windows.

Multicasting - Sending data to a group of destinations at once.

NAT (**N**etwork **A**ddress **T**ranslation) - NAT technology translates IP addresses of a local area network to a different IP address for the Internet.

NAT (**N**etwork **A**ddress **T**ranslation) **Traversal** -A method of enabling specialized applications, such as Internet phone calls, video, and audio, to travel between your local network and the Internet. STUN is a specific type of NAT traversal.

Network - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

NNTP (**N**etwork **N**ews **T**ransfer **P**rotocol) - The protocol used to connect to Usenet groups on the Internet.

Node - A network junction or connection point, typically a computer or work station.

OFDM (**O**rthogonal **F**requency **D**ivision **M**ultiplexing) - Frequency transmission that separates the data stream into a number of lower-speed data streams, which are then transmitted in parallel to prevent information from being lost in transit.

Packet - A unit of data sent over a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

PEAP (**P**rotected **E**xtensible **A**uthentication **P**rotocol) - A mutual authentication method that uses a combination of digital certificates and another system, such as passwords.

Ping (**P**acket **IN**ternet **G**roper) - An Internet utility used to determine whether a particular IP address is online.

POP3 (**P**ost **O**ffice **P**rotocol **3**) - A standard mail server commonly used on the Internet.

Port - The connection point on a computer or networking device used for plugging in cables or adapters.

Power **o**ver **E**thernet (**PoE**) - A technology enabling an Ethernet network cable to deliver both data and power.

PPPoE (**P**oint to **P**oint **P**rotocol **o**ver **E**thernet) - A type of broadband connection that provides authentication (username and password) in addition to data transport.

PPTP (**P**oint-to-**P**oint **T**unneling **P**rotocol) - A VPN protocol that allows the Point to Point Protocol (PPP) to be tunneled through an IP network. This protocol is also used as a type of broadband connection in Europe.

Preamble - Part of the wireless signal that synchronizes network traffic.

RADIUS (**R**emote **A**uthentication **D**ial-**I**n **U**ser **S**ervice) - A protocol that uses an authentication server to control network access.

RJ-45 (**R**egistered **J**ack-**45**) - An Ethernet connector that holds up to eight wires.

Roaming - The ability to take a wireless device from one access point's range to another without losing the connection.

Router - A networking device that connects multiple networks together.

RTP (**R**eal-time **T**ransport **P**rotocol) - A protocol that enables specialized applications, such as Internet phone calls, video, and audio, to occur in real time.

RTS (**R**equest **T**o **S**end) - A networking method of coordinating large packets through the RTS Threshold setting.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

SMTP (**S**imple **M**ail **T**ransfer **P**rotocol) - The standard e-mail protocol on the Internet.

SNMP (**S**imple **N**etwork **M**anagement **P**rotocol) - A widely used network monitoring and control protocol.

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program".

SOHO (**S**mall **O**ffice/**H**ome **O**ffice) - Market segment of professionals who work at home or in small offices.

SPI (**S**tateful **P**acket **I**nspection) **Firewall** - A technology that inspects incoming packets of information before allowing them to enter the network.

Spread Spectrum - Wideband radio frequency technique used for more reliable and secure data transmission.

SSID (**S**ervice **S**et **ID**entifier) - Your wireless network's name.

Static IP Address - A fixed address assigned to a computer or device that is connected to a network.

Static Routing - Forwarding data in a network via a fixed path.

STUN (**S**imple **T**raversal of **U**DP through **N**ATs) - A protocol that enables specialized applications, such as Internet phone calls, video, and audio, to travel between your local network and the Internet. STUN is a specific type of NAT traversal.

Subnet Mask - An address code that determines the size of the network.

Switch - 1. A data switch that connects computing devices to host computers, allowing a large number of devices to share a limited number of ports. 2. A device for making, breaking, or changing the connections in an electrical circuit.

TCP (**T**ransmission **C**ontrol **P**rotocol) - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.

TCP/IP (**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol) - A set of instructions PCs use to communicate over a network.

Telnet - A user command and TCP/IP protocol used for accessing remote PCs.

TFTP (**T**rivial **F**ile **T**ransfer **P**rotocol) - A version of the TCP/IP FTP protocol that has no directory or password capability.

Throughput - The amount of data moved successfully from one node to another in a given time period.

TKIP (**T**emporal **K**ey **I**ntegrity **P**rotocol) - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.

Topology - The physical layout of a network.

TX Rate - Transmission Rate.

UDP (**U**ser **D**atagram **P**rotocol) - A network protocol for transmitting data that does not require acknowledgement from the recipient of the data that is sent.

Upgrade - To replace existing software or firmware with a newer version.

Upload - To transmit a file over a network.

URL (**U**niform **R**esource **L**ocator) - The address of a file located on the Internet.

VPN (**V**irtual **P**rivate **N**etwork) - A security measure to protect data as it leaves one network and goes to another over the Internet.

WAN (**W**ide **A**rea **N**etwork)- The Internet.

WEP (**W**ired **E**quivalent **P**rivacy) - A method of encrypting network data transmitted on a wireless network for greater security.

WINIPCFG - A Windows 98 and Me utility that displays the IP address for a particular networking device.

WLAN (**W**ireless **L**ocal **A**rea **N**etwork) - A group of computers and associated devices that communicate with each other wirelessly.

WPA (**W**i-Fi **P**rotected **A**ccess) - a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

Appendix D: Specifications

Standards	IEEE 802.3, IEEE 802.3u, HomePlug 1.0
Ports	One 10/100 Auto-Sensing RJ-45 Port
Cabling Type	UTP CAT 5 or better
Data Rate	Up to 14 Mbps
LEDs	Ethernet, Activity, Link
Security Features	56-bit Data Encryption with Key Management, Network Password to secure local powerline networking
Dimensions (L x W x H)	2.68" x 4.25" x 2.60" (68 mm x 108 mm x 66 mm)
Unit Weight	9 oz. (0.255 kg)
Certifications	FCC Class B, UL, HomePlug 1.0
Operating Temp.	0ºC to 40ºC (32ºF to 104ºF)
Storage Temp.	-20ºC to 70ºC (-4ºF to 158ºF)
Operating Humidity	10% to 85% Non-Condensing
Storage Humidity	5% to 90% Non-Condensing

Appendix E: Warranty Information

LIMITED WARRANTY

Linksys warrants to You that, for a period of one year (the "Warranty Period"), your Linksys Product will be substantially free of defects in materials and workmanship under normal use. Your exclusive remedy and Linksys' entire liability under this warranty will be for Linksys at its option to repair or replace the Product or refund Your purchase price less any rebates. This limited warranty extends only to the original purchaser.

If the Product proves defective during the Warranty Period call Linksys Technical Support in order to obtain a Return Authorization Number, if applicable. BE SURE TO HAVE YOUR PROOF OF PURCHASE ON HAND WHEN CALLING. If You are requested to return the Product, mark the Return Authorization Number clearly on the outside of the package and include a copy of your original proof of purchase. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. You are responsible for shipping defective Products to Linksys. Linksys pays for UPS Ground shipping from Linksys back to You only. Customers located outside of the United States of America and Canada are responsible for all shipping and handling charges.

ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE WARRANTY PERIOD. ALL OTHER EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF NON-INFRINGEMENT, ARE DISCLAIMED. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to You. This warranty gives You specific legal rights, and You may also have other rights which vary by jurisdiction.

This warranty does not apply if the Product (a) has been altered, except by Linksys, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Linksys, or (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Linksys does not warrant that the Product will be free of vulnerability to intrusion or attack.

TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL LINKSYS BE LIABLE FOR ANY LOST DATA, REVENUE OR PROFIT, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING NEGLIGENCE), ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE THE PRODUCT (INCLUDING ANY SOFTWARE), EVEN IF LINKSYS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL LINKSYS' LIABILITY EXCEED THE AMOUNT PAID BY YOU FOR THE PRODUCT. The foregoing limitations will apply even if any warranty or remedy provided under this Agreement fails of its essential purpose. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to You.

Please direct all inquiries to: Linksys, P.O. Box 18558, Irvine, CA 92623.

Appendix F: Regulatory Information

FCC STATEMENT

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna
• Increase the separation between the equipment or devices
• Connect the equipment to an outlet other than the receiver's
• Consult a dealer or an experienced radio/TV technician for assistance

INDUSTRY CANADA (CANADA)

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

EC DECLARATION OF CONFORMITY (EUROPE)

In compliance with the EMC Directive 89/336/EEC, Low Voltage Directive 73/23/EEC, and Amendment Directive 93/68/EEC, this product meets the requirements of the following standards:

• EN55022 Emission
• EN55024 Immunity

Appendix G: Contact Information

Need to contact Linksys?
Visit us online for information on the latest products and updates
to your existing products at: http://www.linksys.com or
                                                                 ftp.linksys.com

Can't find information about a product you want to buy
on the web? Do you want to know more about networking
with Linksys products? Give our advice line a call at: 800-546-5797 (LINKSYS)
Or fax your request in to: 949-823-3002

If you experience problems with any Linksys product,
you can call us at: 800-326-7114
Don't wish to call? You can e-mail us at: support@linksys.com

If any Linksys product proves defective during its warranty period,
you can call the Linksys Return Merchandise Authorization
department for obtaining a Return Authorization Number at: 949-823-3000
(Details on Warranty and RMA issues can be found in the Warranty
Information section in this Guide.)